Procedure to drill an exempt well in a platted subdivision:

Prepared for the Water Policy Interim Committee

Presented by Dave Potts

January 10, 2012

First I want to share with the committee what is required to be a licensed water well contractor in Montana.

The Montana Board of Water Well Contractors is responsible for issuing water well drilling licenses. All domestic water wells and water wells for stock watering or irrigation that are deeper than 25 feet are required to be drilled under the direction of a licensed Water Well Contractor. To obtain a drilling license, the individual must first fill out an application. The applicant is required to have a minimum of 12 months drilling experience within the last three years. The applicant must also provide three professional references. Upon the approval of the application, the applicant must pass a written examination with a minimum score of 80%. Once the applicant passes the test a $4000 bond must be obtained and proof of the bond submitted before the license is issued.

There is one exception to the requirement of needing a license to drill a well which applies to landowners, land lessees or renters. These individuals may apply for an Exemption Permit that allows them to drill or work on a well that is located on their property.

When a licensed Water Well Contractor (WWC) is contacted by a potential customer that needs to have an exempt well drilled in a subdivision the process the contractor typically goes through begins with researching the well location by township, range and section to determine type of construction. This is generally done by going to the Ground Water Information Center's or GWIC web site to investigate well depths and construction in the specific section.

The contractor would then check out the subdivision plat to determine well locations on the specific lot.

Then it's generally a good practice to make a site visit and locate the well on the property to ensure that everything is consistent w/ the plat and that utilities, driveways, easements, property boundaries and sewer systems don't interfere with the well location.

The contractor would then prepare a proposal and or agreement with the customer. If an agreement is made then a schedule would be sent to drill and the construction of the well would begin.

Constructing the well

Construction standards for an exempt well are in the Administrative Rules of Montana (ARM) 36-21-6

- Typical construction is to drill and set casing while continuously introducing bentonite w/ advancement of casing.

In a sand and gravel aquifer the well casing is advanced until adequate water for the customer's needs is found. The well is typically completed either open bottom to allow water into the well or it is perforated or screened in order to allow adequate quantities of water into the well. Perforations and/or screens are also installed in order to control sand from being pumped.

- Non typical construction may include drilling a larger diameter hole (typically 3") to a minimum of 25 feet in order to protect the aquifer from surface contamination
- Special construction standards apply when artesian wells are encountered.

Drilling continues until a water bearing formation is encountered. Water bearing formations can consist of unconsolidated materials such as gravels or consolidated materials such as sedimentary, igneous and metamorphic formations.

In wells completed in consolidated formations steel casing is advanced till refusal and then the borehole is advanced in the open hole until adequate water is encountered. At this point the well is developed by air lift and surging in order to clean up the water, maximize production and verify that the well will continue to provide adequate water for the customers' needs. Once development is completed a liner casing is installed in the open hole portion of the well. Perforations in the liner are located in the water bearing areas. The primary purpose of the liner is to protect the pump and keep the borehole from collapsing.

Actual construction will be based on local geological conditions and the best method to ensure protection of groundwater and successful completion of the well. All methods of construction must meet construction codes as per Montana Codes Annotated (MCA) 37.43 and ARM 36-21-6.

In certain instances it can be difficult to determine actual well production by air lifting of the water. In these situations a submersible pump is installed and the well is test pumped in order to determine production and drawdown. Water samples can and often are collected at this time to determine water quality.

The two final steps in the drilling of the well are to chlorinate and cap the well. Chlorination can be done by putting chlorine tablets in the well or injecting chlorine into the air line and forcing it to the bottom of the well and back out. This will leave residual chlorine in the well and will also decontaminate the drill string which will prevent cross contamination with/ the next well. Capping the well can be done either with a sanitary well cap (if pump is going to be installed soon) or a metal plate welded onto the top to prevent entry until a permanent pump system can be installed.

When wells are completed the casing is terminated a minimum of 18 inches above ground level and 18 inches above floodplain level.

A pump system can then be installed in the well. Often the water well contractor will install the system but not always.

Design of the pump system is determined by flow requirements, pumping water level, system pressure and the well production.

Installation of the pump system consists of:

Water line

Pitless adapter/unit

Pressure tank

Pump

Pump controls

Frost free hydrants for stock and irrigation

Electrical wiring

Domestic and irrigation needs cannot exceed 35 gpm or 10 acre feet and therefore pump systems are not installed that can exceed this. In some instances such as fire protection a higher flow rate is required. If the aquifer can supply the flow rates a pump system is installed that will meet these rates but flow rates to the domestic is restricted so that more than 35 gpm is not available on the domestic side.

Finally, before the job is really done the paperwork has to be completed. This includes invoicing and filing of the well log with the Montana Bureau of Mines and Geology's GWIC. This can either be done by filling out a form or doing it on line. A copy of the well log and the water right application form 602 is given to the well owner who is notified that it is their responsibility to complete the form and submit it with/ payment of $125.00 to the DNRC for a water right.

Links that may be of interest to the committee:

http://www.mbmg.mtech.edu/ Montana Bureau of Mines to access the GWIC, GWIP, and GWAP information.

http://dnrc.mt.gov/wrd/water_op/bwwc/default.asp Montana Board of Water Well Contractors to access rules and regulations, driller regulations and a host of other water related information.

http://www.mwwda.org/ Montana Water Well Drillers Association website

http://www.watersystemscouncil.org/ National Water Systems Council provides information about the Wellcare Program and national statistics and information on household wells and small water systems.

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View hydrograph for this site
View water quality for this site

Site Name: BWIPBE HBRD * HBRD2
GWIC Id: 259073

Section 1: Well Owner

Owner Name
GAFFKE RANCH, LLC
Mailing Address
618 BUCKHORN TRAIL

City	State	Zip Code
BOZEMAN	MT	59718

Section 2: Location

Township	Range	Section	Quarter Sections
01S	05E	31	NW¼ NE¼ NW¼ NE¼

County: GALLATIN
Geocode:

Latitude	Longitude	Geomethod	Datum
45.71316309	111.152224858	SUR-GPS	NAD83

Ground Surface Altitude	Method	Datum	Date
4603.06	SUR-GPS	NAVD88	3/17/2011

Measuring Point Altitude	Method	Datum	Date Applies
4606.36	SUR-GPS	NAVD88	10/8/2010 3:35:00 AM

Addition: **Block**: **Lot**:

Section 3: Proposed Use of Water

MONITORING (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Friday, October 08, 2010

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	250	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-3.5	4	6	0.25		WELDED	A53B STEEL
-3	240	2			FLUSH THREAD	PVC-SCHED 80

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
240	250	2		20 SLOT	FACTORY SLOTTED

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	230	BENTONITE	Y
230	250	SAND PACK	Y

Section 7: Well Test Data

Total Depth: 250
Static Water Level: -12
Closed-in Pressure: 5.2 psi
Water Temperature:

Air Test *

20 gpm with drill stem set at 20 feet for 1 hours.
Time of recovery 0.33 hours.
Recovery water level -12 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL
1	10	SOME LARGE COBBLES
10	15	WET SAND
15	23	SANDY GRAVEL WITH COARSE GRAVEL
23	25	SOME SILT, GRAVELS, SAND AND SOME FINE CLAY
25	50	SILTY SAND AND SOME CLAY
50	70	SILTY CLAY WITH PEA GRAVELS
70	80	COARSE GRAVEL AND SOME SAND
80	90	GRAVEL LAYER, SOME FINE CLAY
90	100	SILTY SAND, SMALL GRAVELS
100	120	MEDIUM TO SMALL GRAVELS
120	140	MEDIUM TO LARGE GRAVELS AND ALITTLE CLAY
140	160	PEA GRAVEL AND SOME CLAY
160	190	COARSE SAND WITH BLACK ,RED, PURPLE, BROWN BASALT
190	194	COARSE SAND, FEW GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: CURT SAMPSON
Company: BRIDGER DRILLING INC
License No: WWC-560
Date Completed: 10/8/2010

Site Name: BWIPBE HBRD
GWIC Id: 259073
Additional Lithology Records

From	To	Description
194	205	LIGHT BROWN CLAY
205	210	CLAY WITH FINE SAND
210	215	COARSE SAND AND FINE SAND
215	230	COARSE SAND, GRAVELS BLACK PURPLE BASALT
230	250	COARSE TO FINE SAND, VERY FEW GRAVELS AND BASALT

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View hydrograph for this site
View water quality for this site

Site Name: BWIPBE HBRD * HBRD3
GWIC Id: 259072

Section 1: Well Owner

Owner Name
GAFFKE RANCH, LLC
Mailing Address
618 BUCKHORN TRAIL

City	State	Zip Code
BOZEMAN	MT	59718

Section 2: Location

Township	Range	Section	Quarter Sections
01S	05E	31	NW¼ NE¼ NW¼ NE¼

County
GALLATIN

Geocode

Latitude	Longitude	Geomethod	Datum
45.713203193	111.152414599	SUR-GPS	NAD83

Ground Surface Altitude	Method	Datum	Date
4603.34	SUR-GPS	NAVD88	3/17/2011

Measuring Point Altitude	Method	Datum	Date Applies
4606.46	SUR-GPS	NAVD88	10/8/2010 3:40:00 AM

Addition **Block** **Lot**

Section 3: Proposed Use of Water

MONITORING (1)

Section 4: Type of Work

Drilling Method: ROTARY

Section 5: Well Completion Date

Date well completed: Friday, October 08, 2010

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	70	8

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-3.5	4	6	0.25		WELDED	A53B STEEL
-3	60	4			SPLINE	PVC-SCHED 80

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
60	70	4		20 SLOT	FACTORY SLOTTED

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	25	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 70
Static Water Level: 3
Water Temperature:

Air Test *

35 gpm with drill stem set at 50 feet for 1 hours.
Time of recovery 0.33 hours.
Recovery water level 3 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL
1	5	SOME GRAVELS AND COARSE BLACK SILT
5	10	GRAVELS AND SOME CLAY
10	60	CLAY AND GRAVEL WITH BLACK, PURPLE, BASALTS
60	70	GRAVELS, BLACK, PURPLE AND RED BASALTS, COARSE SAND

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: CURT SAMPSON
Company: BRIDGER DRILLING INC
License No: WWC-560
Date Completed: 10/8/2010

Form No. 602 R 3/19/2009

NOTICE OF COMPLETION OF GROUNDWATER DEVELOPMENT

Use this form for completed groundwater developments where the water has been put to use for the purposes identified with a maximum use of 35 GPM not to exceed 10 AC-FT per year.

Filing Fee $125.00

FOR DEPARTMENT USE ONLY

Notice No. _____ Basin _____
Priority Date _____ Time _____AM - PM
Rec'd By _____
Fee Rec'd $ _____ Check No. _____
Deposit Receipt # _____
Payor (if different from name(s) listed in item 1 below)
_____
Refund $ _____ Date

⇨ Go to web site http://www.dnrc.mt.gov/wrd/ to learn additional information about the use of this form.
⇨ Your priority is determined by the date of filing. If it is determined this form was improperly filed, your priority date may be changed.
⇨ If your development is within a Controlled Ground Water Area, the regional office will contact you to explain the correct filing requirements.

1. **NAME** _____
MAILING ADDRESS _____
CITY _____ STATE _____ ZIP_____
WORK PHONE _____ HOME PHONE_____ CELL PHONE_____

2. **DIVERSION USED TO OBTAIN GROUNDWATER**
☐ Well – Attach well log, if available Water Well Contractor Name: _____
☐ Developed Spring (Excavation performed at the spring location.)
☐ Pit/Pond – Surface Area _____ Acres _____Depth

3. **FLOW RATE USED** _____GPM

4. **COMBINATION OR SHARED DEVELOPMENT**
a. Will this development be used in combination with another well or spring? ☐ Yes ☐ No
b. Will this development be shared by other users? ☐ Yes ☐ No
If yes for either question, list the water right numbers and explain how the development is used. _____

5. **PURPOSE AND PERIOD OF USE**

Domestic	Number of homes supplied _____ Year round use? ☐ Yes ☐ No If no, from _____ to _____, inclusive of each year.
Lawn & Garden	Total Size of lawn and/or garden - length x width _____ April 1 – October 31 ☐ Yes ☐ No If no, from _____ to _____, inclusive of each year.
Irrigation	Type of crop _____ Total Crop Acres Irrigated _____ April 1 – October 31 ☐ Yes ☐ No If no, from _____ to _____, inclusive of each year.
Stock (Example: 100 Cows & 1 Horse)	Number and type _____ Year round use? ☐ Yes ☐ No If no, from _____ to _____, inclusive of each year.
Other	Describe the purpose of the use _____ Amount of water used _____ gallons per day Number of days used _____ Year round use? ☐ Yes ☐ No If no, from _____ to _____, inclusive of each year.

6. **POINT OF DIVERSION** – Location of Ground water Development
_____1/4 _____1/4 _____1/4 Section _____ Twp _____N / S Rge _____E /W County _____
Lot _____ Block _____ Tract No. _____ Subdivision Name _____
Government Lot No. _____ COS No. _____
Street or Road Address, including City, State & Zip Code of the Development _____

7. **PLACE OF USE** - Enter the 17 digit geocode applicable to the place of use legal land description _____ If there are multiple places of use, attach additional sheets and list the geocode for each legal land description. The geocodes can be found in county records.

Is the place where water is used the same as the point of diversion? ☐ Yes ☐ No
If no, enter the place of use land description below. Attach additional sheets if necessary.
☐ Domestic ☐ Stock ☐ Irrigation ☐ Other
_____1/4 _____1/4 _____1/4 Section _____ Twp _____N / S Rge _____E /W County _____
Lot _____ Block _____ Tract No. _____ Subdivision Name _____
Government Lot No. _____ COS No. _____
Street or Road Address, including City, State & Zip Code of the Place of Use _____

8. **AFFIDAVIT OF OWNERSHIP OR WRITTEN CONSENT**
I have possessory interest in the property where the water has been put to beneficial use and I have the exclusive property rights in the ground water development works **OR** I have attached written consent of the person owning the ground water development works and/or written notification to the land owner pursuant to MCA 85-2-306(1).

The statements appearing here are to the best of my knowledge true and correct.

Appropriator's Signature _____ Date: _____

_____ Date: _____

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION
1424 9th AVE - PO BOX 201601 - HELENA MT 59620-1601
PHONE: 406-444-6610 WEBSITE: http://www.dnrc.mt.gov/wrd/

FORM 602, NOTICE OF COMPLETION OF GROUNDWATER DEVELOPMENT EXCEPTIONS FOR A SMALL GROUND WATER DEVELOPMENT

INSTRUCTIONS

To use this form, the following must apply to your water use.

- The ground water must have been put to use for the purpose(s) identified.
- The development is not located within the boundaries of a Controlled Ground Water Area.
- The source is ground water, meaning any water located beneath the ground surface. The water is typically diverted from the ground via a well, developed spring, or a collection of water in a ground water pit or pond.
- The flow rate used is 35 gallons per minute or less. This is the rate you are taking water from the source.
- The total volume used from the development does not exceed 10 acre-feet per year. If you share a well with others, the total volume used by all of the users cannot exceed 10 acre-feet per year. If the water use exceeds that amount, then you must file an Application for Beneficial Water Use Permit.

It is important to accurately provide all of the information requested. A description of your right will be as good as the information you provide. If incorrect information is provided, no water right may exist or in the case of land descriptions that are incorrect, you may not receive notification of proposed projects in the area that may impact your development.

A map included with your filing must include the following information - North Arrow, Section, Township, Range and mark an X where the development is located. If the required information is included on the map, DNRC will confirm the written land description matches the map. If it does not, DNRC will change the written description to match the map.

Complete items 1 through 8 ONLY if you have determined this is the correct form to file.

All of the required information must be entered for your application to be considered correct and complete as required under 85-2-306, MCA.

Item 1. Enter the complete name of the person to be listed as the water right owner(s), their mailing address, and phone numbers.

Item 2. Check the type of ground water development used to obtain the ground water. If the source is a well, provide the well driller's name. If the source is a ground water pit or pond, provide the surface area and depth of the pond. This information will be used to determine the evaporation that will occur from the pond.

Item 3. Enter the flow rate used. To determine the actual flow rate you are pumping, turn the water on until the pump comes on and stays on. Time how many seconds it takes to fill a 5-gallon bucket. Use the following formula to calculate the flow rate. *300/# of seconds = flow rate in GPM.* You can also turn on the bathtub faucet and time (in minutes) how long it takes to fill a 1 or 5 gallon bucket.

Item 4. Check yes if the development is connected with another well or spring. Check yes if the development is shared by other users. For example, two homes on well. If you answer yes to either question, provide the water right number and document how the development is used. If a shared well agreement exists, provide a copy of that agreement.

Item 5. Check the purposes for which the water is used. If the water is used during the months specified, check 'yes'. If not, check 'no' and enter the month and day water is used each year. Include lawn and garden watering under the "Irrigation" purpose.

Item 6. Enter the land description for the location of the development. Describe the location to the nearest 10 acres if possible. Legal land descriptions, subdivisions, geocodes, and certificate of survey information may be obtained from the well log; the county records; or from the Montana Cadastral system at: http://gis.mt.gov/.

Subdivisions –	In addition to the above description, enter the lot and block or tract number, subdivision name.
Government Lots –	In addition to the land description, enter the government lot number.
Certificate of Survey -	In addition to the land description, enter the survey number.
Street or Road Address –	Enter the physical address of the development including city, state, and zip code.

Item 7. Enter the land description for where the water is used. Describe the location to the nearest 10 acres if possible. Legal land descriptions, subdivisions, geocodes, and certificate of survey information may be obtained from the well log; the county records; or from the Montana Cadastral system at: http://gis.mt.gov/.

Subdivisions –	In addition to the above description, enter the lot and block or tract number, subdivision name.
Geocode(s) -	Enter the geocode(s) for the land description entered.
Government Lots –	In addition to the land description, enter the government lot number.
Certificate of Survey -	In addition to the land description, enter the survey number.
Street or Road Address	Enter the physical address of the development including city, state, and zip code.

Item 8. If the statements are correct, sign the form.

Send the form to your local Water Resources Regional Office. The office addresses can be found at Web address http://www.dnrc.mt.gov/wrd/. Click on Regional Offices selection.